The suprarenal on the right side is small, rather darker in color than normal, on section the cortex is not prominent, but the medulla shows the normal brown pigmentation. The left suprarenal is normal. The kidneys are equal in size, their consistency slightly decreased, the surface slightly bluish in color, with round areas of a dark red color under the capsule; these patches do not project above the surface; cutting through these patches we find a wedge-shaped hemorrhagic area extending down into the cortex; the pelvis of the kidney is dark mottled red; the cortex is of normal width, the whole cut surface, both cortex and pyramids, of a pinkish color; the capsule strips normally.

The bladder is full of amber colored urine, its walls are normal, and the prostate is not enlarged.

Throughout the ilium the solitary follicles are enlarged to about pinhead size and, with Peyer's patches, are prominent; in the ascending colon there are masses of apparently adenoid tissue, dark red in color, ulcerated on the surface; the base of the ulcers appear smooth, and are of the same color as the surrounding tissue.

The mesenteric lymph glands are much enlarged, being from the size of a split pea to one and three-quarters inch; they are of a light yellowish color throughout; the lymphatics in the lesser omentum are much enlarged, some being one by one and a half by one and a quarter inches; the cervical, right epitrochlear, mediastinal and inguinal lymphatic glands are similarly enlarged and affected.

The sternal bone marrow is a dull red color with innumerable spots of apparently connective tissue or blood vessels, with pinpoint to pinhead sized whitish spots; the bone marrow of the left femur is of a dark red color, semi-transparent in appearance throughout the shaft of the bone; the vessels are seen as connective tissue streaks.

Anatomical diagnosis—Acute lymphatic leukemia; emphysema of lungs; hyperplasia of spleen, liver, and of cervical, right epitrochlear, mediastinal, mesenteric, retroperitoneal and inguinal glands, and of bone marrow, and lymphoid deposits in kidneys, ileum, anterior mediastinum, and elsewhere throughout the body.

RAILWAY SURGEONS

NON-UNION OF FRACTURE.*

By A. W. MORTON, M. D., San Francisco.

The subject which I have selected is one of so much importance that I believe a discussion by this body of Railroad Surgeons will be of much benefit.

This can not be overestimated when we consider that the railroads of this country produce more fractures than all other corporations combined. We must also consider the legal aspect, and the amount of dissatisfaction which it causes to the surgeon and the patient, to say nothing of the anxiety of the friends and the ever present claim agent. I believe we will all agree that it does not receive the attention it merits.

Every surgeon will sooner or later meet one of these perplexing problems where the patient will not be willing to go to the hospital where he can receive more radical treatment, so long as he is not suffering any special pain, and the claim agent has not settled. Such cases often last long periods of time; the attending surgeon condemning himself for the result, the patient and his friends are often of the same opinion, and do not hesitate to say so.

With our improved methods of diagnosis and treatment, we should seldom get this condition if we give the patient the proper treatment in the beginning. We should skiagraph the fracture just before and after the primary treatment to see that the bones are placed in the proper relations and that they remain thoroughly immobilized.

You may claim this is impossible, but I want to say that the time is near when the public will demand better results in the treatment of fractures and will not be satisfied with the indemnity received from the railroads, but they will appeal to the courts, who will require better results in this neglected branch of surgery.

If you have failed to take the skiagraph before this condition arises, do you think you have been able to administer the proper preventive treatment? These are questions we should consider well; the jury may do it later.

Non-union is referred to a fracture where all effort on the cells of the part have ceased to perform bony union. This condition varies, according to the location of the bone fractured, and we seldom speak of non-union until several months of delay causes us to anticipate that nature has exhausted her efforts in repair. This condition is generally attributed to constitutional and local causes. Any of the constitutional diseases which lower the vitality of the patient may be a predisposing cause, and should always be noticed.

The great factor is found in the local condition of the fracture which has not been relieved at the first dressing; defective treatment. The ends of the bones are not placed in approximation; they may be separated by muscles, tendons, intervening fragments of bones, or muscular action, all of which have a tendency to separate the pericostal bridge. Suppuration and necrosis often act as a factor.

The local treatment is divided into the non-operative and the operative. It is well to assume that the treatment has been at fault, and that the non-union is generally a result of imperfect apposition of the fractured bones and imperfect immobilization.

The parts should be placed in apposition and thoroughly immobilized, and kept in that position for several weeks, which will often correct the defect. Should this fail, some of the local methods should be tried to stimulate the formation of callus.

The Bier method of producing venous congestion locally is produced by applying a rubber bandage just above the fracture snug enough to cause the parts to become slightly swollen, and not to pro-

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duce any unpleasant feelings. This should be an adjunct to the other treatment and applied for a few hours night and morning. This will seldom fail to relieve the condition of delayed union, and assist in the cure of non-unions.

Bier has also suggested the injection of twenty to thirty c.c. of blood from the patient between the ends of the fracture. The ends of the bones may be stimulated by applying counter-irritation over the seat of fracture by percussing the parts with a hammer, so as to produce a local congestion. Forcibly rubbing the ends of the bones together has many advocates. Some irritate the ends of the bones by drilling into them. Injecting irritants such as tincture of iodin between the ends of the bones is used with some success.

The most practical method is to expose ends of the bones, resect them so that you have the parts as nearly like a fresh fracture as possible. The bones are retained in position by means of sutures, staples, pins, or better, strong metallic plates such as are recommended by Arbuthnot Lane. There is a tendency for the muscles to contract and produce much tension, which may cause a loosening of the screws or a fracture of the plate. Should this be in the leg, by severing the tendo-Achillis, the parts will be retained much easier. One of the most difficult fractures I have found to hold is in the upper third of the thigh, where the upper fragment has a tendency to be tilted outward and forward as a result of the gluteus maximus. In such a case the lower part of the attachment of the muscle should be severed.

The plates are united to the bones by screws. The wound should be closed with the most extreme care. If there is any branch of surgery that requires more perfect technic than any other, it is in this class of work. The parts should be supported by plaster or some form of splint.

Should there be much loss of bone in the arm or leg, the space may be filled by using the accompanying bone and permitting one end to retain its vascular attachment. If the space should be next the upper end of the tibia, the patella may be utilized to procure union.

In 1901 I performed the first case of non-union by transplanting of bone from the lower animals to man, by retaining its vascular attachment.

The case was one of the osteomyelitis of the lower end of the tibia, where it was necessary to remove about five inches of bone. The fore-leg of a small dog, after being prepared, was amputated just above the tarsus, leaving the radius one inch longer than the ulna. The skin and muscles were separated from the dog's leg for five inches. The radius extending into the cavity of the tibia, the ulna along the side of the tibia, which was retained in position by wiring. The skin was closed to near the lower end of the wound, the dog's bone passing out at the lower angle. The large tendons of each leg were severed and each limb closed in plaster-of-Paris. Then the entire dog, except his head and genital organs and the leg of the man, were enclosed in paster-of-Paris. Five weeks later the cast was removed and the bones sawed and placed in contact with the astragalus. Union was firm after a few months and the bone gradually filled in the same size as the tibis. The case was reported in the transactions of the California State Society in 1902, and American Medicine, July 12, 1902.

DISEASES AND INJURIES TO KNEE JOINT AND TREATMENT OF SAME.*

By ETHAN H. SMITH, M. D., San Francisco.

First, let me express my approbation of the term used by Robert Jones, of Liverpool, England, for this class of cases, that of derangement of the knee joint. Of all the major articulations of the human anatomy, none is more exposed to disease and injury than the knee joint. The more we know concerning afflictions of the knee joint, the more complex the matter becomes. We formerly designated these conditions under two heads—tubercular and non-tubercular. To the surgeon having wide experience in these cases, even with the help of the X-ray, this designation becomes inadequate. It is not always possible to say whether a knee joint is tubercular or non-tubercular. Many knee joints becoming deranged, because of an external injury and non-tubercular for an indefinite period, after such injury, become tubercular in time. We must frequently reserve our diagnosis as to the exact condition until we have had the case under observation for some length of time. As to the conditions which we may find in a deranged knee joint, they may comprise one of the following list of diseases. Synovitis with effusion; tubercular arthritis involving both the synovial membrane and the articular cartilage, or the cartilagenous structures of the joint with little involvment of the synovial structures. We may have a joint deranged by what may prove to be an arthritis deformans, in which many other articulations will be involved; we may have a loose piece of cartilage, as a result of an injury, which acts as a foreign body and in which there is no serious inflammatory condition present, but which, if neglected, frequently becomes tubercular; we may have a serious derangement of the knee joint, due to injury to the semi lunar cartileges, which, if treated, appropriately, will pursue a non-tubercular course, but which, if neglected, frequently undergoes tubercular infection; we may also have a derangement of the knee joint due to constant slight daily trauma, or to the peculiar occupation of the individual, which latter case is frequently not properly diagnosed, or appreciated, in its true light, because the conditions which cause the same are considered to be of not sufficient consequence to produce disease. We may frequently have a gouty condition, aggravated by occupation or injury, resulting in serious derangement of the knee joint. Experience has taught us that frequently the beginning of a serious derangement is a slightly bruised spot. In this bruised spot capillary stasis occurs. If the tubercular bacillus effect a lodgment in such spot, it is the ideal soil for the production of a colony. The cases of tuberculosis of the knee joint arising without memorable history of a serious injury, or perhaps, any injury at all, arise from the

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